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APPLICATION FOR UNITED STATES LETTERS PATENT

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TITLE:                        HEADLIGHT ASSEMBLY HAVING  
                                 VERTICAL HEADLAMP ADJUSTER

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## HEADLIGHT ASSEMBLY HAVING VERTICAL HEADLAMP ADJUSTER

### 1. Technical Field

**[0001]** This invention generally relates to a headlight assembly and, more specifically, to a headlight assembly having a vertical headlight adjustment mechanism.

### 2. Description of the Related Art

**[0002]** It is well known to use adjustment mechanisms to align the vertical and horizontal position of a vehicle's headlight with respect to the vehicle itself. Known adjustment mechanisms use complex, multi-component systems.

**[0003]** One such system, generally known as a "right angle adjuster", includes two shafts positioned perpendicular to each other, joined by a gear box and attached to the reflector. One disadvantage of this type of system is that it is more likely to bind due to the horizontal displacement of its pivot in a constant vertical plane. Other known systems utilize constant adjusters that are accessed from the rear of the headlight housing. These types of systems are difficult to access due to the tight packaging of the components under the hood of the vehicle.

**[0004]** In view of the above and other disadvantages, there exists a need for an improved headlight assembly with a simplified adjustment procedure and mechanism. It is an object of this invention to provide such an assembly.

### SUMMARY OF INVENTION

**[0005]** The present invention overcomes the disadvantages of prior designs by providing a less complex adjustment mechanism for a headlight assembly. The headlight assembly of the present invention includes a headlight housing, a reflector positioned within and pivotally connected to the housing by at least two connection

or pivot points, an adjuster clip connected to the reflector, and an adjuster screw that is partially received within the clip and threadably engaged with the assembly's housing. For convenience and ease of use, the adjuster is accessible from the top of the headlight assembly. As torque is applied to the adjuster screw, the entire reflector radially pivots about a transverse horizontal pivot axis, which is defined by the connection points. Accordingly, the aim of the headlight is vertically adjusted.

**[0006]** To ensure that the assembly does not bind during adjustment, a lower most head of the adjuster screw is received and rides within an arc shaped channel in the adjuster clip. The arc of the channel is such that pivoting of the adjuster clip with the headlight will not cause binding on the generally vertically oriented adjuster screw in the clip.

**[0007]** Further objects, features and advantages of this invention will become readily apparent to persons skilled in the art after a review of the following description, with reference to the drawings and claims that are appended to and form a part of this specification.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0008]** Figure 1 is a front elevational view of a headlight assembly embodying the present invention;

**[0009]** Figure 2 is a cross-sectional view generally taken along line 2-2 of Figure 1; and

**[0010]** Figure 3 is an enlarged cross-sectional view of the adjuster screw and clip generally encircled by line 3-3 in Figure 2.

## DETAILED DESCRIPTION OF THE INVENTION

**[0011]** Referring now to the drawings, Figure 1 generally illustrates a headlight assembly 20 embodying the principles of the present invention and specifically adapted for use in a motor vehicle (not shown). The headlight assembly 20 includes as its primary components, a housing 22, a reflector 24, an adjustment assembly 26 and a pair of pivots 40. Preferably, two headlight assemblies 20 are mounted to the front of a vehicle, one located on each side thereof.

**[0012]** The housing 22 is connected to the frame of the vehicle through one or more mounting bores 31. Accordingly, the housing 22 is fixed in a stationary position relative to the vehicle.

**[0013]** In the illustrated embodiment, the housing 22 defines a recessed cavity 32 for receipt of the reflector 24. The reflector 24 itself is defined by a top wall 34, a bottom wall 36, and a curved rear wall 38 extending between the top and bottom walls 34, 36 that also defines the sides of the reflector 24. (Directional references used herein are relative to the orientation of the vehicle and are solely intended to aid in clarity.) As shown in Figure 1, the headlight assembly 20 is provided for mounting on the passenger side, or right side, of the vehicle. A headlight assembly mounted to the driver's side, or left side, of the vehicle would be a mirror image of the assembly 22 seen in Figure 1.

**[0014]** Located immediately below the bottom wall 36 of the reflector 24 are the pivots 40, which include a pivot clip 44 and a pivot screw 46 that are more readily seen in Figure 2. As seen in Figure 2, the pivot clip 44 is snap fit or friction mounted to a mounting bracket 48 generally extending from the bottom wall 36 of the reflector. The central portion of the pivot clip 44 defines a socket 50 which

retainingly engages and receives a ball shaped head 52 of the pivot screw 46. Opposite the head 52, the pivot screw 46 is provided with a fastening end 54. In the preferred embodiment, the fastening end 54 is provided with threads or other means enabling the pivot screw 46 to be engaged with a mounting boss 56 located on the housing 22 so as to be generally adjacent to the mounting brackets 48 of the reflector 24. The utilization of two pivots 40 helps to restrict movement of the reflector 24 to rotation about a pivot axis 42 while illustrated as having a ball-and-socket type construction. As will be obvious to one skilled in the art, the specific construction of the pivots 40 need not be limited to a ball-and-socket joint construction. Other constructions, such as those utilizing axles, pins or other means, would equally be acceptable, so long as the pivots permit rotation of the reflector 24 about the pivot axis 42.

**[0015]** The reflector 24 also includes portions 58 defining an aperture 60 for receipt of a light source, hereafter bulb 62. Preferably, the aperture 60 is located on the rear wall 38 of the reflector 24, generally near the center thereof. Mounting of the bulb 62 in the aperture 60 may be achieved by any now known, such as a twist-lock engagement mechanism or hereafter developed method.

**[0016]** Referring now to Figures 2 and 3, the adjustment assembly 26 as seen therein includes an adjustment clip 64 and an adjustment or aiming screw 28. The adjustment clip 64 is secured to the reflector 24 by way of a mounting bracket 68 integrally formed with the reflector 24. Any suitable engagement mechanism can be utilized to retain the adjustment clip 64 with the mounting bracket 68, including without limitation, frictional, interference, snap-fit, adhesive and others. Formed in the adjustment clip 64 is a channel 70 which is generally U shaped in cross-section

having a more narrow opened end 72, as seen in Figure 1, oriented in the direction of the top wall of the housing 22. As such, two opposed shoulders 74 define the open end 72. Along its length, the channel 70 is curved or arc shaped as seen in Figure 3. The nature and orientation of this curve or arc is such that the rear most portion 76 of the channel 70 is generally vertically lower than the forward most portion 78 of the channel 70. The reasons for the arced shape of the channel 70 will become apparent from the discussion which follows below. While it may be provided with a fixed lower wall, the lower most wall 80, as illustrated, is provided as a cantilevered member from the remainder of the adjustment clip 64, enabling the lower most wall 80 to resiliently deflect relative to the remainder of the clip 64.

**[0017]** The aiming screw 28 includes a threaded middle section 82 that is received within a threaded bore 84 defined in a boss 86 of the housing 22. The aiming screw 28 may be provided with a self-tapping screw thread such that the threaded bore is formed in the boss 86 when the screw 28 is installed. The first end or the upper end 83 of the aiming screw 28 is formed with a driving head 88 suitably shaped to receive a driving tool (not shown) for imparting rotation to the aiming screw 28. The opposing or second end 85 of the screw 28 is provided with a generally round or ball head 92. The aiming screw 28, threaded boss 86 and channel 70 of the adjustment clip 64 are all oriented such that when fully assembled, the driving head 88 of the aiming screw 28 extends generally vertically through the top wall 73 of the housing 22, while the ball head 92 is received within the channel 70.

**[0018]** For ease of assembly, the diameter "d" of the ball head 92 is less than the diameter "D" of the threaded bore 84. As such the ball head 94 can be inserted

through the threaded bore 84 as the aiming screw 28 is mounted therein via the threaded middle section 82.

**[0019]** With the aiming screw 28 in the boss 86, the reflector 24, with the clip 64 attached, is positioned within the housing 22 such that the ball head 94 is received through the rearward end 76 of the clip 64. Thereafter, the ball head 94 is upwardly restrained within the channel 70 by the shoulders 74 that define a reduced width slot above the ball head 94.

**[0020]** Assembled as such, when further torque is applied to the driving head 88 of the aiming screw 28, be it advancement or retraction of the aiming screw 28, the engagement between the ball head 92 and the channel 70 will cause pivotal movement of the reflector 24. Advancement, downward rotation of the aiming screw 28, causes the ball head 92 to apply a downward force against the lower wall 80 of the channel 70. In response to the downward force, the reflector 24 pivots about the pivot axis 42 in a downward direction and the ball head 92 slides toward the rearmost portion 76 of the channel 70. Upon retraction, upward rotation of the aiming screw 28, the ball head 92 exerts an upward force on the shoulders 74 of the channel 70 causing the reflector 24 to pivot about the pivot axis 42 in an upward direction. During upward pivoting, the ball head 92 slides within the channel toward the forward most portion 78 thereof. From this, it is seen that the arc shape of the channel 70 provides for nonlinear vertical displacement of the reflector 24 in response to torque applied to the aiming screw 28. Further, while the aiming screw 28 only moves along a linear axis, the arc shape of the channel 70 prevents binding with the ball head 92 as the reflector 24 pivots relative to the aiming screw axis 96.

**[0021]** In an alternative embodiment, the adjustment clip 64 is unitarily formed with the reflector 24 and is such that the channel 70 is directly incorporated into a portion of the reflector 24.

**[0022]** Constructed in this manner, the orientation of the adjustment clip 64 and its channel 70, relative to the reflector 24, is not critical to the operation of the headlight assembly 20. This in turn frees design and construction possibilities from the normal constraints related thereto.

**[0023]** As a person skilled in the art of vehicle headlight systems will recognize from the previous detailed description and from the figures and claims, modifications and changes can be made to the preferred embodiments of the invention without departing from the scope of this invention defined in the following claims.